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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/513,207	02/24/2000	Jian Li	7468.0002	6210

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EXAMINER

SODERQUIST, ARLEN

ART UNIT	PAPER NUMBER
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1743

DATE MAILED: 01/02/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

PL 9

<b>Office Action Summary</b>	Application No. 09/513,207	Applicant(s) LI ET AL.	
	Examiner Arlen Soderquist	Art Unit 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 October 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

Art Unit: 1743

1. Claims 11-15 and 23-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11-15 are incomplete, omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are those between the ultraviolet spectrometer and the device capable of providing ultraviolet absorption data. The claims are basically and assemblage of parts with no cooperative structural relationships. In claims 19-20 it is not clear if applicant is claiming a pump as a structural limitation or if the functional language further modifies the structure to allow the liquid to flow through the flow cell. In claims 23-24 it is not clear what structural limitation is set forth by the process (functional) language.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 11 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Karlberg (newly cited and applied). In the patent Karlberg teaches a process and device for measuring chemical and physical parameters for characterizing and classifying aqueous suspensions. The invention relates to a method of determining physical and/or chemical properties in water samples containing suspended substances and/or particles, the physical and/or chemical properties being singly or jointly determined as amount of nitrate, iron, ammonium, phosphate, total nitrogen or total phosphorous; turbidity, chemical oxygen demand (COD) and/or biological oxygen demand (BOD). Column 6 line 36 to column 7 line 2 teaches some detail of the invention. The method according to the invention is detailed for discrete and manually collected water samples, but the method is not limited to samples collected in this way and a continuous in situ measurement can also be used. The optical measurement can suitably be performed by means of fiber optics. The light source and light detector are located at a distance

Art Unit: 1743

from the object to be measured, while the measuring cell is placed in the water sample. The measuring device receives the light from the light source by way of one or more optical fibers. Light not absorbed by the sample is by means of the same principle returned to the light detector. Absorbance data for calibration are recorded for samples having known amounts of or measured values for nitrate, ammonium, orthophosphate, total nitrogen, total phosphorous, iron, COD, turbidity etc. within the wavelength area of 190-820 nm in steps of 2 nm. Air or distilled water can be used as reference. The number of samples used like this for calibration should preferably exceed 100 and the samples must be typical for the condition to be studied. The samples are preferably selected in such a way that too many samples having an almost identical composition are avoided. Absorbance data for sample measurement are collected on unfiltered samples (air or water as reference) from several waste water purifying plants, whereby processing according to any of the models PLS, PCR or neural networks is made.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 12, 14-15, 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlberg as applied to claim 11 above, and further in view of Doyle. Karlberg does not teach using an ATR tunnel flow cell in the method or device.

In the paper Doyle discusses the analysis of strongly absorbing chromophores by UV/visible ATR spectroscopy. This article illustrates the potential of the attenuated total reflectance (ATR) sampling technique for UV/visible analysis and explores ways in which this potential can be maximized. Although UV/visible ATR is far from new, it was largely neglected, perhaps because of the limited range of operating conditions used in previous work. By the appropriate choice of ATR optical design and operating parameters the authors were able to maximize the sensitivity of the technique for diverse sample conditions. The design they developed was a tunnel flow cell shown in figure 4. The advantages of this system is that it eliminates the restriction of angle of incidence which allows the use of materials such as fused silica (page 50). The device of figure 4 also does not need a mirror to function. Figure 8 shows spectra accumulated over the claimed region for the silica ATR element. The authors also observed artifacts at high concentrations of some analytes, which are a result of refractive index dispersion resulting from strong electronic transitions in the vacuum UV region. Of particular interest is the potential for using small amounts of solvent to shift the frequencies of these artifacts so as to optimize the analysis of minor constituents.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the configuration of Karlberg with the tunnel flow cell configuration of Doyle because of its advantages taught by Doyle such as optimizing the system for maximum sensitivity and elimination of a restriction on the angle of incidence.

6. Claims 1-2, 4-13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danielsson in view of Karlberg as explained above and Ley (newly cited and applied). In the paper Danielsson discusses UV-Vis spectroscopic measurements in opaque solutions: process liquors in the paper and pulp industries. Initial attempts at using an attenuated total reflection probe for measurements in process liquors of the kraft pulp and paper industries are discussed. In white liquor, sulfides and polysulfides were the only species giving appreciable absorption. The probe could be used for sulfide concentrations 1 M. The range of applicability was influenced by the total solute concentration through its effect on the refractive index of

the solution. The absorption was related to concentration in a non-traditional way, but this was largely overcome by the use of multivariate calibration methods. The black liquor resulting from the cook contained large amounts of highly absorbing organic compounds, especially lignin. Using synthetic solutions, a successful calibration model for sulfides, lignin, and total solute content was constructed. Before long-time use of the probe in highly alkaline media can be recommended, a protection for the end mirror must be included. Relative to the wavelength capabilities the spectra of figure 5 have a range which goes from 190 nm – 380 nm, covering the claimed range. Danielsson does not show absorption data that goes below about 210 nm.

In the paper Ley presents ultra-violet absorption spectrum of hydroxyl ion. The absorption spectra of solutions of NaOH in water varying from 0.063 to 0.066 N, of Ba(OH)<sub>2</sub> solutions from 0.0034 to 0.0528 N and of Ca(OH)<sub>2</sub> at 0.0398 N have been determined. In all cases a maximum was observed at 186 nm; this must be characteristic of OH<sup>-</sup> ion. A brief theoretical discussion is given.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the detection wavelengths of Karlberg into the Danielsson device and method because of the known absorption frequency for hydroxide ion as taught by Ley because of the ability to use the absorption spectra in the regression calculations.

7. Claims 3, 14-15 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danielsson in view of Karlberg and Ley as applied to claims 1, 11 and 16 above, and further in view of Doyle. Danielsson does not teach using an ATR tunnel flow cell in the method or device.

In the paper Doyle discusses the analysis of strongly absorbing chromophores by UV/visible ATR spectroscopy. This article illustrates the potential of the attenuated total reflectance (ATR) sampling technique for UV/visible analysis and explores ways in which this potential can be maximized. Although UV/visible ATR is far from new, it was largely neglected, perhaps because of the limited range of operating conditions used in previous work. By the appropriate choice of ATR optical design and operating

parameters the authors were able to maximize the sensitivity of the technique for diverse sample conditions. The design they developed was a tunnel flow cell shown in figure 4. The advantages of this system is that it eliminates the restriction of angle of incidence which allows the use of materials such as fused silica (page 50). The device of figure 4 also does not need a mirror to function. Figure 8 shows spectra accumulated over the claimed region for the silica ATR element. The authors also observed artifacts at high concentrations of some analytes, which are a result of refractive index dispersion resulting from strong electronic transitions in the vacuum UV region. Of particular interest is the potential for using small amounts of solvent to shift the frequencies of these artifacts so as to optimize the analysis of minor constituents.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the ATR element configuration of Danielsson with the tunnel flow cell configuration of Doyle because of its advantages taught by Doyle such as optimizing the system for maximum sensitivity and elimination of a restriction on the angle of incidence or for a recognition that the mirror problem of Danielsson would not be present in the tunnel flow cell configuration.

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. Relative to the lack of a structural connection, a phrase such as "coupled to" would certainly establish a cooperative structural relationship while not restricting the manner in which the parts are coupled together.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art relates to UV spectrometers and pulp liquids analysis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (703) 308-3989. The examiner's schedule is variable between the hours of about 5:30 AM to about 5:00 PM on Monday through Thursday and alternate Fridays.

For communication by fax to the organization where this application or proceeding is assigned, (703) 305-7719 may be used for official, unofficial or draft papers. When using this number a call to alert the examiner would be appreciated. Numbers for faxing official papers are 703-872-9310 (before finals), 703-872-9311

Art Unit: 1743

(after-final), 703-305-7718, 703-305-5408 and 703-305-5433. The above fax numbers will generally allow the papers to be forwarded to the examiner in a timely manner.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read "Arlen Soderquist".

December 30, 2002

ARLEN SODERQUIST  
PRIMARY EXAMINER